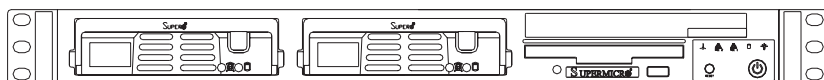


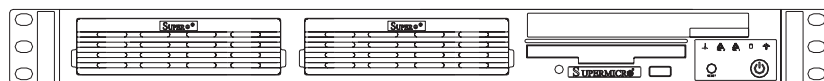
SUPERO[®]

SUPERSERVER 5013S-8 SUPERSERVER 5013S-i

5013S-8



5013S-i



USER'S MANUAL

Revision 1.0a

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5013S-8/5013S-i. Installation and maintenance should be performed by experienced technicians only.

The SuperServer 5013S-8/5013S-i is a high-end single Xeon processor, 1U rackmount server based on the SC810 1U rackmount server chassis and the Super X5SS8-GM (5013S-8)/X5SSE-GM (5013S-i) mainboard. The X5SS8-GM/X5SSE-GM supports single Intel® Xeon™ processors up to 3.06 GHz in 604-pin PGA sockets.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X5SS8-GM/X5SSE-GM mainboard and the SC810 chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 5013S-8/5013S-i into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as SCSI and system LEDs.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 5013S-8/5013S-i.

Chapter 5: Advanced Motherboard Setup

Chapter 5 provides detailed information on the X5SS8-GM/X5SSE-GM motherboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC810 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SCSI or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS Error Beep Codes and Messages

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Chapter 1

Introduction

1-1 Overview

The Supermicro SuperServer 5013S-8/5013S-i is a high-end single processor, 1U rackmount server that features some of the most advanced technology currently available. The SuperServer 5013S-8/5013S-i is comprised of two main subsystems: the SC810 1U rackmount chassis and the X5SS8-GM/X5SSE-GM single Intel Xeon PGA processor mainboard. Please refer to our web site for information on operating systems that have been certified for use with the SuperServer 5013S-8/5013S-i (www.supermicro.com).

In addition to the mainboard and chassis, various hardware components may have been included with your SuperServer 5013S-8/5013S-i, as listed below.

- One CPU heatsink (SNK-0039)
- One (1) CPU air shroud
- One (1) 1.44" floppy drive
- One (1) slim CD-ROM drive
- Two (2) IDE Drive Trays (5013S-i)
- One (1) SCA SCSI backplane (5013S-8)
- Two (2) SCA SCSI drive carriers (5013S-8)
- SCSI Accessories (5013S-8):
 - One (1) internal 68-pin Ultra320 SCSI cable for SCA SCSI backplane
 - One (1) set of SCSI driver diskettes
 - One (1) SCSI manual
- One (1) 64-bit, 66 MHz PCI slot riser card
- Rackmount hardware (with screws):
 - Two (2) rack rail assemblies
 - Six (6) brackets for mounting the rack rails in a rack/telco rack

- One (1) CD-ROM containing drivers and utilities:
Intel's® LANdesk Client Manager
LAN driver
SCSI driver
- SuperServer 5013S-8/5013S-i User's Manual

1-2 Server Chassis Features

The SuperServer 5013S-8/5013S-i is a high-end, scaleable 1U rackmount server platform designed with today's most state-of-the-art features. The following is a general outline of the main features of the SC810 chassis.

System Power

When configured as a SuperServer 5013S-8/5013S-i, the SC810 chassis includes a 250W power supply.

SCSI Subsystem (5013S-8)

The SCSI subsystem on the 5013S-8 supports two 80-pin SCA Ultra320 SCSI hard drives. (Standard 1" drives are supported. SCA = Single Connection Attachment.) The SCSI drives are connected to an SCA backplane that provides power, bus termination and configuration settings. The SCSI drives are also hot-swap units.

Control Panel

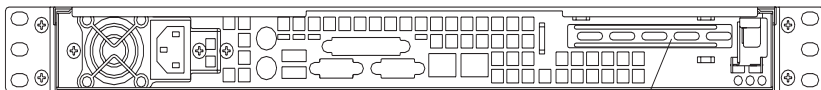
The SC810's control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat conditions. The control panel also includes a main power button and a system reset button.

Rear I/O Panel

The SC810 is a 1U rackmount chassis. Its I/O panel provides one motherboard expansion slot, one COM port (another is internal), two USB ports, PS/2 mouse and keyboard ports, a graphics port and two Ethernet ports. (See Figure 1-1.)

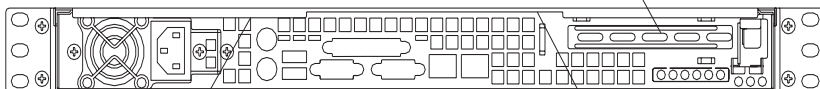
Figure 1-1. Rear I/O Panel

5013S-8



PCI Expansion Slot

5013S-i



Mouse Port

Keyboard Port

USB Ports

COM1 Port

VGA Port

Ethernet Ports

Cooling System

The SC810 chassis has an innovative cooling design that includes a 10-cm blower system cooling (intake) fan and one optional 4-cm fan that can be installed in the midsection of the chassis. The blower fan plugs into a chassis fan header on the motherboard and operates at full rpm continuously. If it breaks down, the ambient air temperature inside the chassis will rise and activate an overheat LED.

1-3 Mainboard Features

At the heart of the SuperServer 5013S-8/5013S-i lies the X5SS8-GM/X5SSE-GM, a single Xeon processor motherboard designed to provide maximum performance. Below are the main features of the X5SS8-GM/X5SSE-GM.

Chipset Overview

ServerWorks Grand Champion SL chipset, comprised of a North Bridge (CMIC-SL) and a South Bridge (CSB6).

North Bridge (CMIC-SL)

The North Bridge interfaces directly to the processors via a 533/400 MHz Host bus and integrates the functions of the main memory subsystem and the IMB bus interface unit. The memory subsystem consists of a 4 DIMM configuration accessed over a 266 MHz memory bus at a peak bandwidth of 1.6 GB/sec.

South Bridge (CSB6)

The South Bridge provides various integrated functions, including the PCI bridge and support for UDMA100, security (passwords and system protection), Plug & Play, USBs, power management, interrupt controllers and the LPC Bus.

Processors

The X5SS8-GM/X5SSE-GM supports single 604 and 603-pin Intel Xeon™ processors of up to at 3.06 GHz at a front side (system) bus speeds of 533 and 400 MHz. Please refer to the support section of our web site for a complete listing of supported processors (<http://www.supermicro.com/TechSupport.htm>).

Memory

The X5SS8-GM/X5SSE-GM has four (4) 168-pin DIMM sockets that can support up to 4 GB of registered ECC DDR-266/200 low-profile SDRAM modules. Module sizes of 128 MB, 256 MB, 512 MB and 1 GB may be used to populate the DIMM slots.

Onboard SCSI (5013S-8)

Onboard SCSI is provided with an Adaptec AIC-7902 SCSI controller chip, which supports dual channel, Ultra320 SCSI at a burst throughput rate of 320 MB/sec for each channel. The X5SS8-GM provides two internal 68-pin LVD Ultra320 SCSI port connector (Channel A and Channel B).

PCI Expansion Slots

The X5SS8-GM/X5SSE-GM has three 64-bit 66 MHz PCI and two 32-bit 33 MHz PCI slots available. One riser card is included with the system for use with one of the 64-bit PCI slots.

Network Interface Controllers (NIC)

The X5SS8-GM/X5SSE-GM supports two Network Interface controllers (NIC) based on Intel's 82551 10/100 Mbps fast Ethernet controller and Broadcom's 5702 Gigabit Ethernet controller. Both a 10/100 Mb and a 1 Gb Ethernet port are included on the I/O panel.

Onboard Controllers/Ports

An onboard IDE controller supports one floppy drive and up to four UDMA/100 hard drives or ATAPI devices. Onboard I/O ports include one COM port, one parallel port, two USB ports, PS/2 mouse and keyboard ports, a video (graphics) port and two LAN (NIC) ports, which back each other up in case one port loses its connection.

Other Features

Other onboard features that promote system health include eight voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

1-4 Contacting Supermicro

Headquarters

Address: SuperMicro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.
Tel: +1 (408) 503-8000
Fax: +1 (408) 503-8008
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support@supermicro.com (Technical Support)
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Web Site: www.supermicro.com.tw

Technical Support:

Email: support@supermicro.com.tw
Tel: 886-2-8226-3990, ext.132 or 139

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 5013S-8/5013S-i up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your SuperServer 5013S-8/5013S-i system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the SuperServer 5013S-8/5013S-i

You should inspect the box the SuperServer 5013S-8/5013S-i was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 5013S-8/5013S-i. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the SuperServer 5013S-8/5013S-i was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.



Warnings and Precautions!



Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the power supply units and hot plug SCSI drives to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (T_{mra}).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4 Installing the Server into a Rack

This section provides information on installing the SuperServer 5013S-8/5013S-i into a rack unit. If the 5013S-8/5013S-i has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. The following is a guideline for installing the 5013S-8/5013S-i into a rack with the rack rails provided with the system. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies with the SuperServer 5013S-8/5013S-i. Each of these assemblies consist of two sections: an inner fixed chassis rail that secures to the 5013S-8/5013S-i (A) and an outer fixed rack rail that secures directly to the rack itself (B). A sliding rail guide sandwiched between the two should remain attached to the fixed rack rail (see Figure 2-1). The A and B rails must be detached from each other to install.

To remove the fixed chassis rail (A), pull it out as far as possible - you should hear a "click" sound as a locking tab emerges from inside the rail assembly and locks the inner rail. Then depress the locking tab to pull the inner rail completely out. Do this for both the left and right side rack rail assemblies.

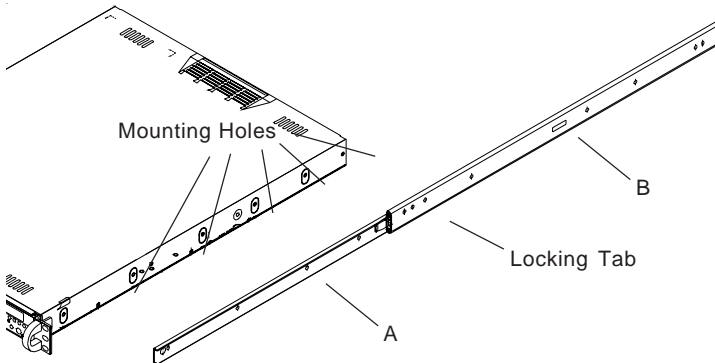


Figure 2-1. Identifying the Sections of the Rack Rails

Installing the Chassis Rails

Position the fixed chassis rail sections you just removed along the side of the 5013S-8/5013S-i chassis making sure the five screw holes line up. Note that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-2). Repeat this procedure for the other rail on the other side of the chassis. You will also need to attach the rail brackets when installing into a telco rack.

Locking Tabs: As you have seen, both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

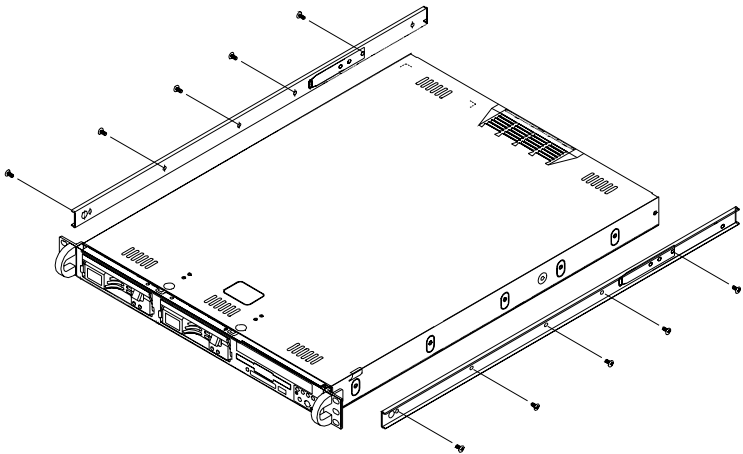


Figure 2-2. Installing Chassis Rails

Installing the Rack Rails

Determine where you want to place the SuperServer 5013S-8/5013S-i in the rack (see [Rack and Server Precautions in Section 2-3](#)). Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the

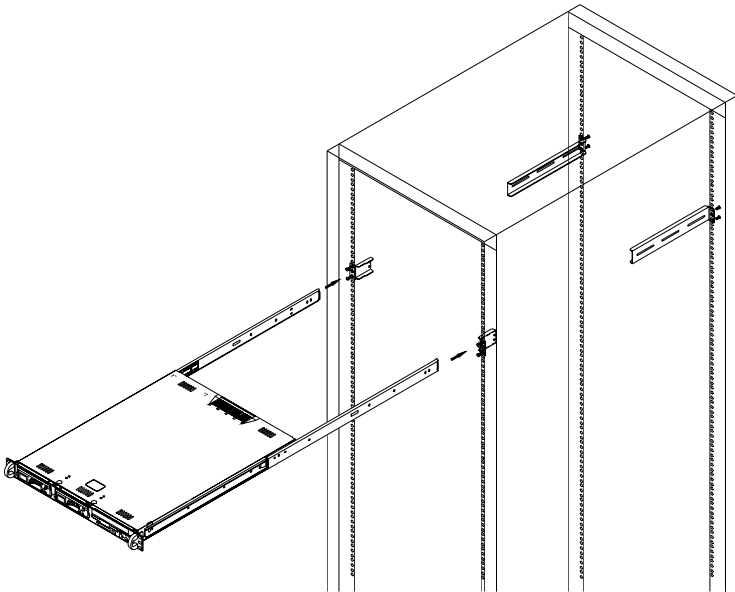
assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure that both are at the exact same height and with the rail guides facing inward.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-3.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

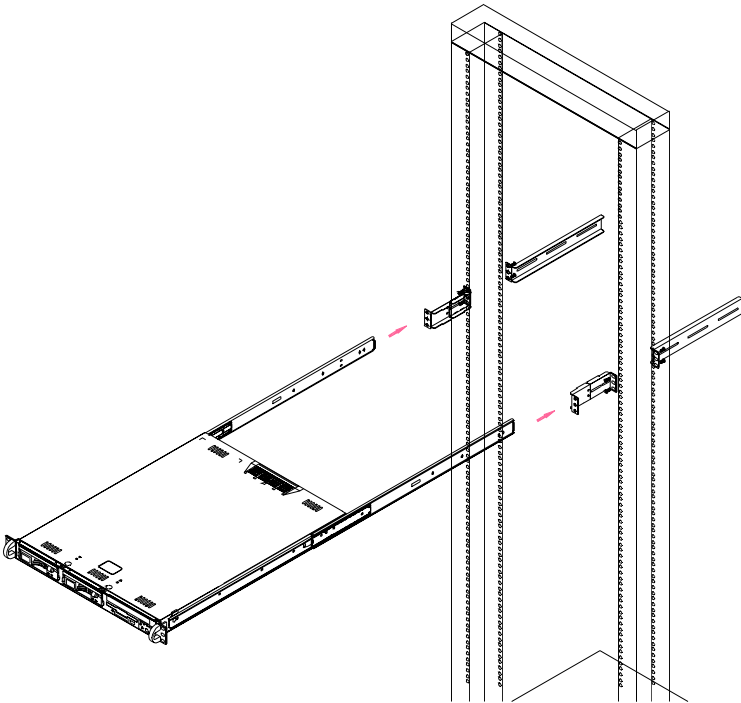
Figure 2-3. Installing the Server into a Rack



Installing the Server into a Telco Rack

If you are installing the SuperServer 5013S-8/5013S-i into a Telco type rack, follow the directions given on the previous pages for rack installation. The only difference in the installation procedure will be the positioning of the rack brackets to the rack. They should be spaced apart just enough to accommodate the width of the telco rack.

Figure 2-4. Installing the Server into a Telco Rack



2-5 Checking the Motherboard Setup

After you install the 5013S-8/5013S-i in the rack, you will need to open the unit to make sure the motherboard is properly installed and all the connections have been made.

1. Accessing the inside of the 5013S-8/5013S-i (Figures 2-5)

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Check the CPU (processor)

You should have one processor already installed into the system board. Each processor should have its own heatsink attached. See Section 5-5 for instructions on processor installation.

3. Check the system memory

Your 5013S-8/5013S-i server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Section 5-5.

4. Installing add-on cards

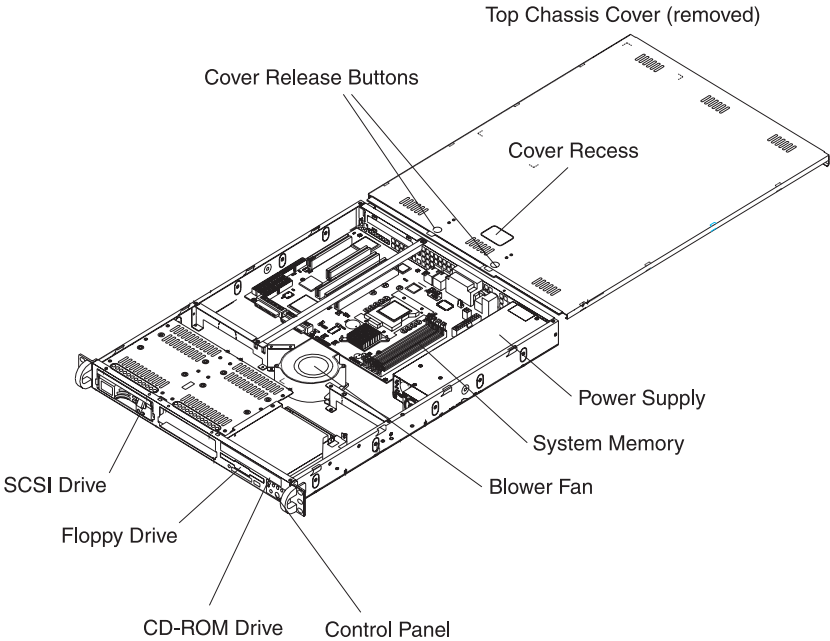
If desired, you can install an add-on card to the system. See Section 5-7 for details on installing a PCI add-on card.

5. Check all cable connections and airflow

Make sure all power and data cables are properly connected and not blocking the airflow. See Section 5-3 for details on cable connections. Also, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.

Note: Make sure that the air seals are properly installed.

Figure 2-5.
Accessing the Inside of the Server
(5013S-8 shown, 5013S-i same but IDE)



2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the SCSI drives and SCA backplane have been properly installed and all connections have been made (SCSI on 5013S-8 only).

1. Accessing the drive bays

All drives can be accessed from the front of the server. For servicing the CD-ROM and floppy drives, you will need to remove the top chassis cover. The SCSI disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. Installing a CD-ROM and floppy disk drives

Refer to Section 6-4 if you need to reinstall a CD-ROM and/or floppy disk drive to the system.

3. Check the SCSI disk drives (5013S-8)

Depending upon your system's configuration, your system may have one or two SCSI drives already installed. If you need to install SCSI drives, please refer to Section 6-4.

4. Check the IDE disk drives (5013S-i)

Depending upon your system's configuration, your system may have one or two IDE hard drives already installed. If you need to install an IDE hard drive, please refer to Section 6-4.

5. Check the airflow

Airflow is provided by a 10-cm input fan and one (optional) 4-cm cooling fan. The system component layout was carefully designed to promote sufficient airflow through the small 1U rackmount space. Also note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

6. Supplying power to the system

The last thing you must do is to provide input power to the system. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS).

Chapter 3

System Interface

3-1 Overview

There are several LEDs on the control panel as well as others on the SCSI drive carriers and the motherboard to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

There are two push-button buttons located on the front of the chassis. These are (in order from left to right) a reset button and a power on/off button.

RESET



- **RESET:** The reset switch reboots the system.



- **POWER:** This is the main power switch, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC810 chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.



- **OVERHEAT:** Indicates an overheat condition in the chassis. This may be caused by cables obstructing the airflow in the system, or the ambient room temperature being too warm. You should also check to make sure that the chassis cover is installed and that all fans are present and operating normally. Finally, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.



NIC2

- **NIC2:** Indicates network activity on LAN2 when flashing.



NIC1

- **NIC1:** Indicates network activity on LAN1 when flashing.



- **HDD:** Indicates IDE drive activity. On the SuperServer 5013S-8, this light indicates CD-ROM drive activity when flashing.



- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 SCSI Drive Carrier LEDs (5013S-8)

Each SCSI drive carrier has two LEDs.

- **Green:** When illuminated, the green LED on the front of the SCSI drive carrier indicates drive activity. A connection to the SCSI SCA backplane enables this LED to blink on and off when that particular drive is being accessed.
- **Red:** A SAF-TE compliant backplane is needed to activate the red LED to indicate a drive failure. (A SAF-TE compliant SCSI backplane is optional on the 5013S-8.) If one of the SCSI drives fail, you should be notified by your system management software. Please refer to Section 6-4 for instructions on replacing failed SCSI drives.

3-5 Motherboard LEDs

- **CR1 (Power On) LED**

The CR1 LED is located near the JF1 connector. When illuminated, it indicates that system power is present on the motherboard.

● LAN Port LEDs

Each of the Ethernet ports (located beside the VGA port) has both a yellow and a green LED. On the Gb LAN port, the yellow LED indicates activity while the the other LED may be green, orange or off to indicate the speed of the connection. See tables below for full explanation.

**100 Mb LAN LED
Indicators**

LED Color	Definition
Green	Connected
Yellow	Active

**1 Gb LAN Left LED
Indicator**

LED Color	Definition
Off	Not Active
Yellow	Active

**1 Gb LAN Right LED
Indicator**

LED Color	Definition
Off	No Connection
Green	100 MHz
Orange	1 GHz

Chapter 4

System Safety

4-1 Electrical Safety Precautions



Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 5013S-8/5013S-i from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the motherboard, memory modules and IDE/CD-ROM/floppy drives. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- **Motherboard Battery: CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities. This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- **CD-ROM Laser: CAUTION** - this server may have come equipped with a CD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

4-2 General Safety Precautions



Follow these rules to ensure general safety:

- Keep the area around the SuperServer 5013S-8/5013S-i clean and free of clutter.
- The SuperServer 5013S-8/5013S-i weighs approximately 26 lbs (11.8 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.
- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions



Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

4-4 Operating Precautions



Care must be taken to assure that the chassis cover is in place when the 5013S-8/5013S-i is operating to assure proper cooling. Out of warranty damage to the 5013S-8/5013S-i system can occur if this practice is not strictly followed.

Chapter 5

Advanced Motherboard Setup

This chapter covers the steps required to install the X5SS8-GM/X5SSE-GM motherboard into the SC810 chassis, connect the data and power cables and install add-on cards. All motherboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the motherboard to better cool and protect the system.

Tools Required

The only tools you will need to install the X5SS8-GM/X5SSE-GM into the chassis are a long and a short Philips screwdriver.

5-1 Handling the X5SS8-GM/X5SSE-GM Motherboard

Electric-static discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). Also note that the size and weight of the X5SS8-GM/X5SSE-GM motherboard may cause it to bend if handled improperly, which may result in damage. To prevent the X5SS8-GM/X5SSE-GM motherboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

- Use a grounded wrist strap designed to prevent Electric Static Discharge (ESD).
- Touch a grounded metal object before removing any board from its anti-static bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their anti-

static bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

5-2 Motherboard Installation

This section explains the first step of physically mounting the X5SS8-GM/X5SSE-GM into the SC810 chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the motherboard, follow the procedure in reverse order.

1. Accessing the inside of the 5013S-8/5013S-i (see Figure 2-5)

Two release buttons are located on the top cover of the chassis. Depressing both of these buttons while pushing the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. (If already installed in a rack, you must first release the retention screws that secure the unit to the rack. Then grasp the two handles on either side and pull the unit straight out until the rails lock into place.)

2. Check compatibility of motherboard ports and I/O shield:

The X5SS8-GM/X5SSE-GM requires a chassis big enough to support a 12" x 8.7" motherboard, such as Supermicro's SC810 1U rackmount. Make sure that the I/O ports on the motherboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. Mounting the motherboard onto the motherboard tray:

Carefully mount the motherboard to the motherboard tray by aligning the board holes with the raised metal standoffs that are visible on the bottom of the chassis. Insert screws into all the mounting holes on your motherboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the motherboard ground to provide a continuous ground for the system.

5-3 Connecting Cables

Now that the motherboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the motherboard layout pages in this chapter for connector locations.)

- IDE Device Cables (J39 and J40)
- Floppy Drive Cable (J28)
- SCSI Device Cables (X5SS8-GM only; JA2, JA3)
- Control Panel Cable (JF1, see next page)

Connecting Power Cables

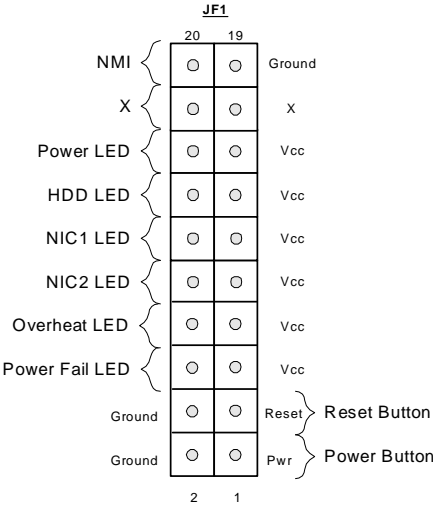
The X5SS8-GM/X5SSE-GM has a 24-pin primary power supply connector designated "ATX Power" for connection to the ATX power supply. See Section 5-9 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single ribbon cable to simplify their connection to the motherboard. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. The control signals are all on the even numbered pins. See Section 5-9 for details and pin descriptions.

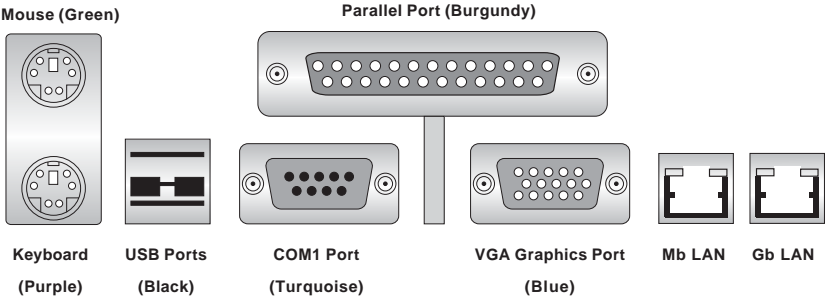
Figure 5-1. Control Panel Header Pins



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. I/O Ports



Note: The COM2 port is a header on the motherboard, located behind the VGA port.

5-5 PGA Processor and Heatsink Installation



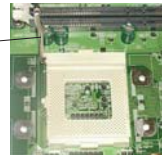
When handling the processor package, avoid placing direct pressure on the label area of the fan. Also, do not place the motherboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

IMPORTANT: Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket **before** you install the heatsink. The X5SS8-GM/X5SSE-GM can support one Xeon processors of up to 3.06 GHz. Pictures below show a 603-pin socket.

1. Lift the lever on the CPU socket.

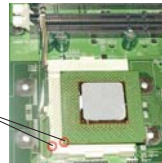
Lift the lever completely or you will damage the CPU socket when power is applied.

Socket lever



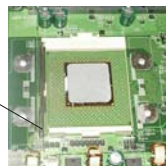
2. Install the CPU in the socket.
Make sure that pin 1 of the CPU is seated on pin 1 of the socket (both corners are marked with a triangle).

Pin 1



3. Press the lever down until you hear it *click* into the locked position. See Figure 5-3 for pictures of the 604-pin CPU socket before and after the processor is installed.

Socket lever in locked position



4. Apply the proper amount of thermal compound to the CPU die and place the heatsink on top of the CPU. Make sure the heatsink sits completely flat on the CPU. If it's not completely flat, the space between the two will degrade the heat dissipation function of the heatsink, which may cause the processor to overheat.

5. Secure the heatsink by locking the retention clips into their proper position. When correctly installed, the retention clips should *click* into place and the three black tabs on the CPU retention pieces should protrude fully through the corresponding holes on the retention clips.

6. An air shroud may have been included with your system to help channel the cooling air over the processor. Position the air shroud over the heatsink/processor assembly as shown in Figure 5-4. If installing two processors, repeat these steps to install the second one.

Figure 5-3. 604-pin PGA Socket: Empty and with Processor Installed



Warning! Make sure you lift the lever completely when installing the CPU. If the lever is only partly raised, damage to the socket or CPU may result.

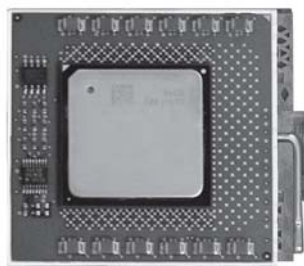
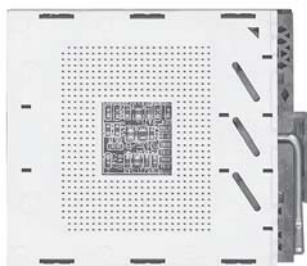
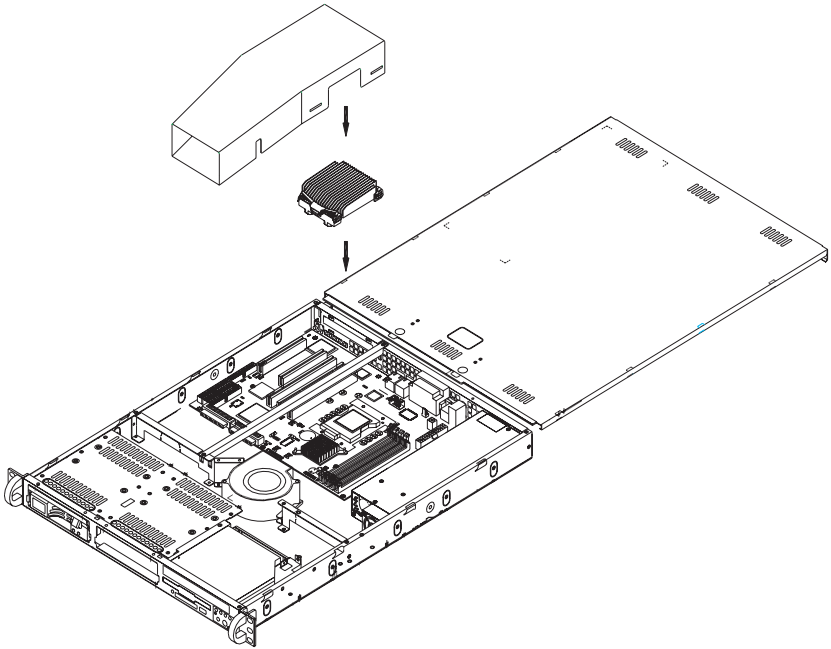


Figure 5-4. Heatsink and Air Shroud Installation



5-6 Installing Memory



CAUTION! Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

1. Memory support

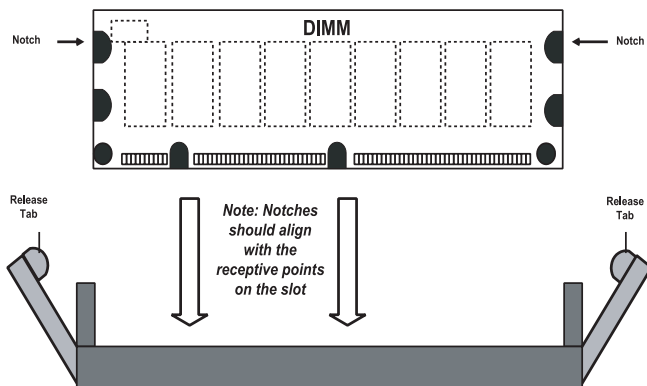
The X5SS8-GM/X5SSE-GM has four 184-pin DIMM sockets that support up to 4 GB of low profile, registered ECC DDR-266/200 SDRAM. You must be running a 533 MHz FSB processor to use DDR-266 SDRAM.

2. Installing memory modules

Insert one to four memory modules. Memory is not interleaved, so you can add any number of DIMMs into the slots in any order. Pay attention to the two notches along the bottom of the module to prevent inserting the module incorrectly. Gently press down on the DIMM module until it snaps into place in the slot (see Figure 5-5). Repeat for more modules as desired.

Note: you should not mix memory modules of different sizes and speeds.

Figure 5-5. Side View of DIMM Installation into Slot



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notches.

To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.

5-7 Adding PCI Cards

1. 64-bit PCI slot

The X5SS8-GM/X5SSE-GM has three 64-bit 66 MHz and two 32-bit, 33 MHz PCI slots available. A riser card designed specifically for use in a 1U rackmount chassis is included with your system. This riser card allows an installed PCI card to sit at a 90 degree angle so it can fit inside the chassis. This riser card accommodates 64-bit PCI cards. Figure 5-6 shows the riser card.

Figure 5-6. 64-bit, 66 MHz Riser Card

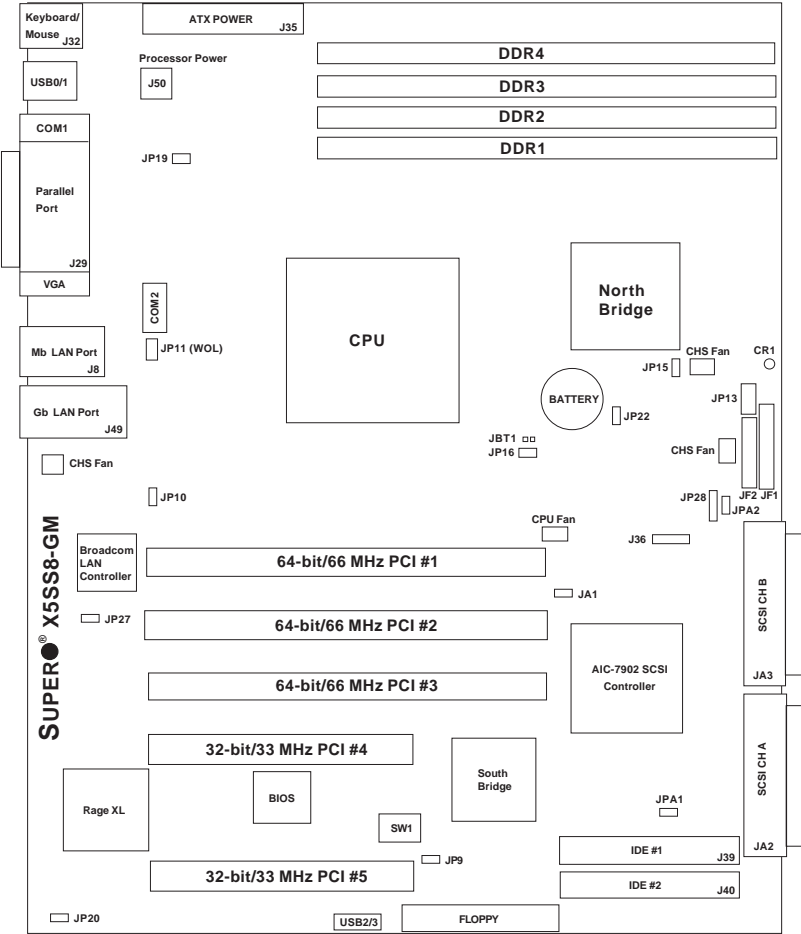


2. PCI card installation

Before installing a PCI add-on card, locate the PCI riser card mentioned in Step 1. Begin by removing the I/O shield for the PCI slot you wish to populate. Fully seat the PCI card into the riser card and screw it into the metal retention rail. Then, insert the riser card into the PCI slot on the motherboard, pushing down with your thumbs evenly on both sides of the card. Finish by using a screw to secure the top of the card shield to the chassis. The I/O shield protects the motherboard and its components from EMI and aid in proper ventilation, so make sure there is always a shield covering each PCI slot.

5-8 Motherboard Details

Figure 5-7. Super X5SS8-GM Layout
(not drawn to scale)



Note: DIP Switch 1 sets the processor speed.
Jumpers not noted are for test purposes only.

Also see this chapter for the locations of the I/O ports and Front Control Panel (JF1/JF2) connectors and for details on jumper settings and pin definitions.

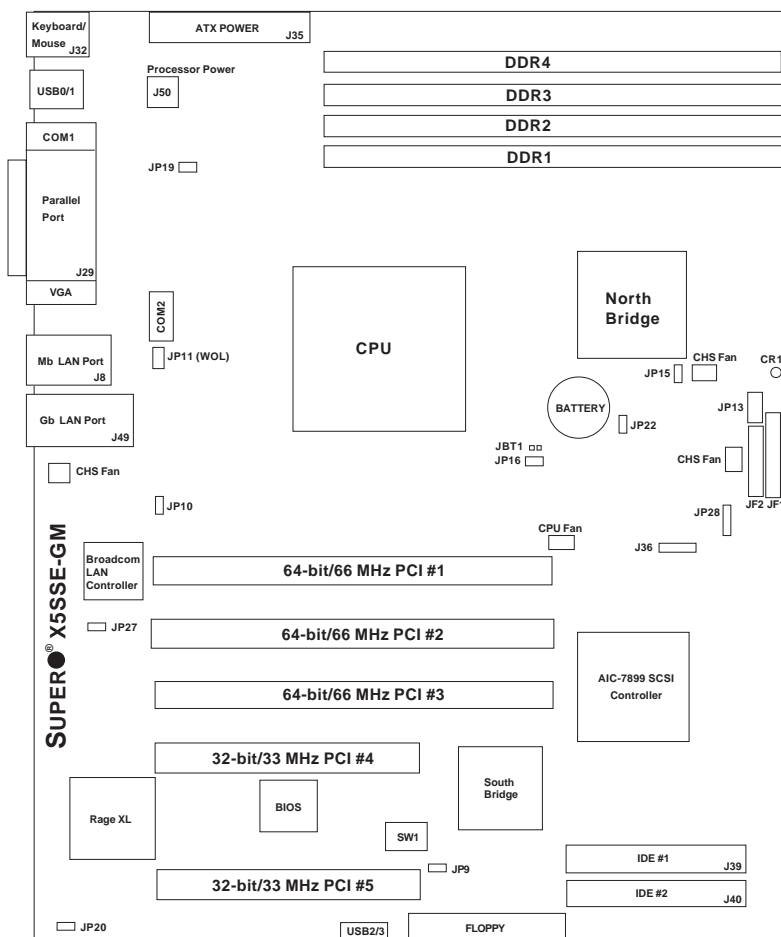
X5SS8-GM Quick Reference

<u>Jumper</u>	<u>Description</u>	<u>Default Setting</u>
JA1	SCSI Enable/Disable	Pins 1-2 (Enabled)
JBT1	CMOS Clear	See Section 5-9
JPA1/A2	SCSI Channel A/B Termination	Off (Terminated)
JP9	VGA Enable/Disable	Pins 1-2 (Enabled)
JP10	Mb LAN Enable/Disable	Pins 1-2 (Enabled)
JP15	Fan Status Select	Open (OH Condition)
JP19	Watch Dog Enable/Disable	Open (Disabled)
JP20	Main Power Override	Off (Normal)
JP22	System Bus Speed Select	Pins 1-2 (Auto)
JP27	Gb LAN Enable/Disable	Pins 1-2 (Enabled)

<u>Switch</u>	<u>Description</u>
DIP Switch 1	Processor Speed

<u>Connector</u>	<u>Description</u>
COM1/COM2	COM1/COM2 Serial Ports
CPU/CHS/OH FAN	CPU/Chassis/Overheat Fan Headers
CPU	CPU Socket
DDR1-DDR4	Memory (SDRAM) Slots
JA2/JA3	Ultra320 LVD SCSI CH A/B Connector
JF1	Front Control Panel Headers
JF2	ChInt/NMI/HD LED/PWR LED Headers
JP11	Wake-on-LAN Header
JP16	Chassis Intrusion Header
JP28	External Speaker Header
J7	VGA Display (Monitor) Port
J8	Mb Ethernet Port
J28	Floppy Disk Drive Connector
J29	Parallel Printer Port
J32	PS/2 Keyboard/Mouse Ports
J35	Primary ATX Power Connector
J36	SMB Header
J39/J40	IDE1/2 Hard Disk Drive Connector
J49	Gb Ethernet Port
J50	Processor Power Connector
USB0/1	Universal Serial Bus Ports
USB2/3	Universal Serial Bus Headers

Figure 5-8. SUPER X5SSE-GM Layout
(not drawn to scale)



Note: DIP Switch 1 sets the processor speed.
Jumpers not noted are for test purposes only.

Also see this chapter for the locations of the I/O ports and Front Control Panel (JF1/JF2) connectors and for details on jumper settings and pin definitions.

X5SSE-GM Quick Reference

<u>Jumper</u>	<u>Description</u>	<u>Default Setting</u>
JBT1	CMOS Clear	See Section 5-9
JP9	VGA Enable/Disable	Pins 1-2 (Enabled)
JP10	Mb LAN Enable/Disable	Pins 1-2 (Enabled)
JP15	Fan Status Select	Open (OH Condition)
JP19	Watch Dog Enable/Disable	Open (Disabled)
JP20	Main Power Override	Off (Normal)
JP22	System Bus Speed Select	Pins 1-2 (Auto)
JP27	Gb LAN Enable/Disable	Pins 1-2 (Enabled)

<u>Switch</u>	<u>Description</u>
DIP Switch 1	Processor Speed

<u>Connector</u>	<u>Description</u>
COM1/COM2	COM1/COM2 Serial Ports
CPU/CHS/OH FAN	CPU/Chassis/Overheat Fan Headers
CPU	CPU Socket
DDR1-DDR4	Memory (SDRAM) Slots
JF1	Front Control Panel Headers
JF2	ChInt/NMI/HD LED/PWR LED Headers
JP11	Wake-on-LAN Header
JP16	Chassis Intrusion Header
JP28	External Speaker Header
J7	VGA Display (Monitor) Port
J8	Mb Ethernet Port
J28	Floppy Disk Drive Connector
J29	Parallel Printer Port
J32	PS/2 Keyboard/Mouse Ports
J35	Primary ATX Power Connector
J36	SMB Header
J39/J40	IDE1/2 Hard Disk Drive Connector
J49	Gb Ethernet Port
J50	Processor Power Connector
USB0/1	Universal Serial Bus Ports
USB2/3	Universal Serial Bus Headers

5-9 Connecting Cables

ATX Power Connection

The power supply connector (at J35) meets the SSI (Superset ATX) 24-pin specification, however it also supports a 20-pin power supply connector. Make sure that the orientation of the connector is correct. See the table on the right for pin definitions.

**24-pin ATX Power Supply Connector (J35)
Pin Definitions**

Pin Number	Definition	Pin Number	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON#	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res(NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

Processor Power Connection

In addition to the Primary ATX power connector (above), the 12v 4-pin Processor Power connector at J50 must also be connected to your power supply. See the table on the right for pin definitions.

**4-Pin +12v Power Supply
Connector (J50)**

Pins	Definition
1 & 2	Ground
3 & 4	+12v

Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

**PWR_LED Pin Definitions
(JF1)**

Pin Number	Definition
15	+5V
16	Control

HDD LED

The HDD LED (for IDE Hard Disk Drives) connection is located on pins 13 and 14 of JF1. Attach the IDE hard drive LED cable to these pins to display disk activity. Refer to the table on the right for pin definitions.

**(IDE) HDD LED Pin
Definitions
(JF1)**

Pin Number	Definition
13	+5V
14	HD Active

L2 LED

The L2 (LAN2 - Gb LAN) LED connection is located on pins 9 and 10 of JF1. Attach an LED cable to display network activity. Refer to the table on the right for pin definitions.

**L2 LED Pin
Definitions
(JF1)**

Pin Number	Definition
9	+5V
10	GND

L1 LED

The L1 (LAN1 - Mb LAN) LED connection is located on pins 11 and 12 of JF1. Attach an LED cable to display network activity. Refer to the table on the right for pin definitions.

**L1 LED Pin
Definitions
(JF1)**

Pin Number	Definition
11	+5V
12	GND

Overheat LED (OH)

Connect an LED to the OH connection on pins 7 and 8 of JF1 to provide advanced warning of chassis overheating. Refer to the table on the right for pin definitions.

**Overheat (OH) LED
Pin Definitions
(JF1)**

Pin Number	Definition
7	+5V
8	GND

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

**Power Fail LED Pin
Definitions
(JF1)**

Pin Number	Definition
5	Control
6	GND

Reset

The Reset connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

**Reset Pin
Definitions
(JF1)**

Pin Number	Definition
3	Reset
4	Ground

PWR_ON

The PWR_ON connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

**PWR_ON Connector
Pin Definitions
(JF1)**

Pin Number	Definition
1	PW_ON
2	Ground

Universal Serial Bus (USB0/1)

Two Universal Serial Bus ports are located beside the keyboard/mouse ports. USB0 is the bottom connector and USB1 is the top connector. See the table on the right for pin definitions.

Universal Serial Bus Pin Definitions
USB0 USB1

Pin Number	Definition	Pin Number	Definition
1	+5V	1	+5V
2	P0-	2	P0-
3	P0+	3	P0+
4	Ground	4	Ground
5	N/A	5	Key

Extra Universal Serial Bus Connection (USB2/3)

Two additional USB headers on the motherboard can provide convenient front side USB access. The odd numbered pins (toward the DIMM slots) are for USB2 and the even numbered pins are for USB3. You will need a USB cable (not included) to use each of these connections. Refer to the tables on the right for pin definitions.

**USB2 Pin
Definitions**

Pin Number	Definition
1	Power
3	-
5	+
7	Ground
9	Key

**USB3 Pin
Definitions**

Pin Number	Definition
2	Power
4	-
6	+
8	Ground
10	NC

NC = No Connection

Serial Ports

The COM1 serial port is located under the parallel port (see Figure 5-2). See the table on the right for pin definitions. The COM2 connector is a header located behind the VGA port.

**Serial Port Pin Definitions
(COM1, COM2)**

Pin Number	Definition	Pin Number	Definition
1	DCD	6	CTS
2	DSR	7	DTR
3	Serial In	8	RI
4	RTS	9	Ground
5	Serial Out	10	NC

PS/2 Keyboard and Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J32. See the table on the right for pin definitions. (The mouse port is above the keyboard port. See Figure 5-2.)

**PS/2 Keyboard
and Mouse Port
Pin Definitions
(J32)**

Pin Number	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

NC = No Connection

Fan Headers

The X5SS8-GM/X5SSE-GM has one CPU, two Chassis and one Chassis/Overheat fan headers. See the table on the right for pin definitions.

**Fan Header Pin Definitions
(CPU/CHS/OH Fans)**

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

Caution: These fan headers are DC power.

LAN (Ethernet) Ports

Two Ethernet ports are located beside the VGA port on the IO backplane. These ports accept RJ45 type cables. See the next section for a description of the LEDs on the LAN ports.

Note: The X5SS8-GM/X5SSE-GM has one 10/100 Mb and one 1 Gb LAN port. When viewed from the rear, the Mb port is on the left (see Figure 5-2).



Chassis Intrusion

A Chassis Intrusion header is located on JP16. Attach the appropriate connector here to inform you of a chassis intrusion condition.

External Speaker Header

Connect a cable from an external speaker to the JP28 header on the motherboard if you wish to use external speakers instead of the onboard speaker.

Wake-On-LAN

The Wake-On-LAN header is designated JP11. See the table on the right for pin definitions. You must have a LAN card with a Wake-on-LAN connector and cable to use this feature.

**Wake-On-LAN Pin
Definitions (JP11)**

Pin Number	Definition
1	+5V Standby
2	Ground
3	Wake-up

SMB

An SMB (System Management Bus) header is located at J36. Connect the appropriate cable here to utilize SMB on your system.

**SMB Header
Pin Definitions (J36)**

Pin Number	Definition
1	Data
2	Ground
3	Clock
4	+5V Standby

5-10 Onboard Indicators

LAN Port LEDs

Each of the Ethernet ports (located beside the VGA port) has a yellow and a green LED. See the tables to the right for the functions associated with these LEDs. On the Gb LAN port, the yellow LED indicates activity while the other LED may be green, orange or off to indicate the speed of the connection (as specified in the table at right).

100 Mb LAN LED Indicators

LED Color	Definition
Green	Connected
Yellow	Active

1 Gb LAN Right LED Indicator

LED Color	Definition
Off	No Connection
Green	100 MHz
Orange	1 GHz

1 Gb LAN Left LED Indicator

LED Color	Definition
Off	Not Active
Yellow	Active

CR1 LED

CR1 is an onboard LED that serves as a power indicator. It is located near JF1. See the table on the right for the meaning of each of the three colors displayed by CR1.

Onboard LED Power Indicator (CR1)

LED Color	Definition
Green	Power On
Yellow	Standby Mode
Red	CPU Error

5-11 DIP Switch Settings

DIP Switch 1: Processor Speed

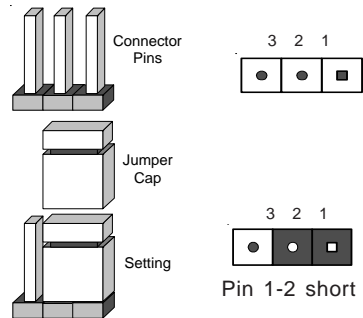
The red "DIP" switch labeled SW1 has four individual switches, which are used to set the speed of the processor.

On the X5SS8-GM/X5SSE-GM, the BIOS automatically detects the speed of the processor(s), meaning you do not have to make any changes to DIP Switch 1.

5-12 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.



Note: On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins. "Off" means open with no jumper cap included for those pins.

CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

- 1) First power down the system and unplug the power cord(s)
- 2) With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver
- 3) Remove the screwdriver (or shorting device)
- 4) Reconnect the power cord(s) and power on the system.

Note: Do not use the PW ON connector to clear CMOS.

VGA Enable/Disable

JP9 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

**VGA Enable/Disable
Jumper Settings
(JP9)**

Jumper Position	Definition
1-2	Enabled
2-3	Disabled

Fan Status Select

JP15 allows you to change the status of the Overheat/Chassis fan to either activate only during an overheat condition (set in BIOS) or to remain active at all times. The default position is open. See the table on the right for jumper settings.

**Fan Status Select
Jumper Settings (JP15)**

Jumper Position	Definition
Open	Overheat
Closed	Always On

Watch Dog Enable/Disable

JP19 is used to enable or disable the Watch Dog function. This jumper is used together with the Watch Dog enable function in BIOS. Enable both the jumper and the BIOS setting to use the Watch Dog feature. See the table on the right for pin definitions.

**Watch Dog Enable/
Disable
Jumper Settings (JP19)**

Jumper Position	Definition
Open	Disabled
Closed	Enabled

Mb LAN Enable/Disable

Change the setting of jumper JP10 to enable or disable the Mb LAN port on the motherboard. See the table on the right for jumper settings. The default setting is pins 1-2.

**Mb LAN
Enable/Disable
Jumper Settings
(JP10)**

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Gb LAN Enable/Disable

Change the setting of jumper JP27 to enable or disable the Gb LAN port on the motherboard. See the table on the right for jumper settings. The default setting is pins 1-2.

**Gb LAN
Enable/Disable
Jumper Settings
(JP27)**

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

SCSI Termination Enable/Disable (5013S-8)

Jumpers JPA1 and JPA2 allow you to enable or disable termination for the SCSI connectors. Jumper JPA1 controls SCSI channel A and JPA2 is for SCSI channel B. The normal (default) setting is open to enable (terminate) both SCSI channels. See the table on the right for jumper settings.

**SCSI Channel Termination
Enable/Disable
Jumper Settings
(JPA1, JPA2)**

Jumper Position	Definition
Open	Enabled
Closed	Disabled

Note: In order for the SCSI drives to function properly, please do not change the default setting set by the manufacturer. See the table on the right for jumper settings.

SCSI Controller Enable/Disable (5013S-8)

Jumper JA1 allows you to enable or disable the SCSI headers. The default setting is pins 1-2 to enable SCSI. See the table on the right for jumper settings.

**SCSI Enable/Disable
Jumper Settings
(JA1)**

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

5-13 Parallel Port, Floppy/Hard Disk Drive and SCSI Connections

Note the following when connecting the floppy and hard disk drive cables:

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

Parallel Port Connector

The parallel port is located on J29.
See the table below right for pin definitions.

**Parallel (Printer) Port Pin Definitions
(J29)**

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Floppy Connector

The floppy connector is located on J28. See the table below for pin definitions.

**Floppy Connector Pin Definitions
(J28)**

Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

IDE Connectors

There are no jumpers to configure the onboard IDE#1, #2 and #3 connectors (J39, J40 and J41, respectively). See the table on the right for pin definitions.

Note: IDE#3 only supports a CD-ROM device.

IDE#1 and #2 support all devices and can also be used to support IDE RAID levels 0,1 and 10.

**IDE Connector Pin Definitions
(J39, J40, J41)**

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

Ultra320 SCSI Connectors (5013S-8)

Refer to the table below for the pin definitions of the Ultra320 SCSI connectors located at JA2 and JA3.

**68-pin Ultra320 SCSI Connectors
(JA2, JA3)**

Connector Contact Number	Signal Names	Connector Contact Number	Signal Names
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DB(P1)	39	-DB(P1)
6	+DB(0)	40	-DB(0)
7	+DB(1)	41	-DB(1)
8	+DB(2)	42	-DB(2)
9	+DB(3)	43	-DB(3)
10	+DB(4)	44	-DB(4)
11	+DB(5)	45	-DB(5)
12	+DB(6)	46	-DB(6)
13	+DB(7)	47	-DB(7)
14	+DB(P)	48	-DB(P)
15	GROUND	49	GROUND
16	DIFFSENS	50	GROUND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20	GROUND	54	GROUND
21	+ATN	55	-ATN
22	GROUND	56	GROUND
23	+BSY	57	-BSY
24	+ACK	58	-ACK
25	+RST	59	-RST
26	+MSG	60	-MSG
27	+SEL	61	-SEL
28	+C/D	62	-C/D
29	+REQ	63	-REQ
30	+I/O	64	-I/O
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

5-14 Installing Software Drivers

After all the hardware has been installed you must install the software drivers. The necessary drivers are all included on the Supermicro CD that came packaged with your motherboard. After inserting this CD into your CD-ROM drive, the display shown in Figure 5-9 should appear. (If this display does not appear, click on the My Computer icon and then on the icon representing your CD-ROM drive. Finally, double click on the S "Setup" icon.)

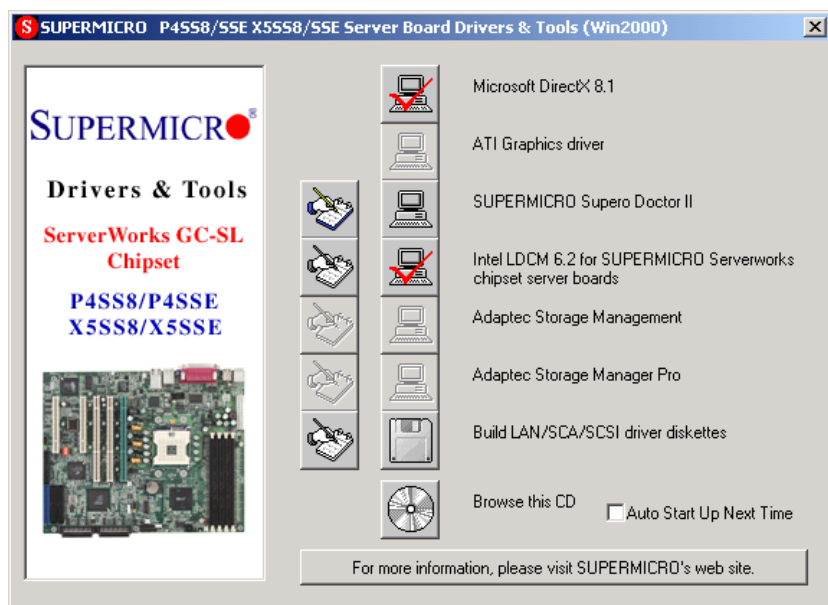


Figure 5-9. Driver/Tool Installation Display Screen

Click the icons showing a hand writing on paper to view the readme files for each item. The bottom icon with a CD on it allows you to view the entire contents of the CD.

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC810 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required

The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its anti-static bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard, add-on cards and peripherals back into their anti-static bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Figure 6-1. Chassis Front View

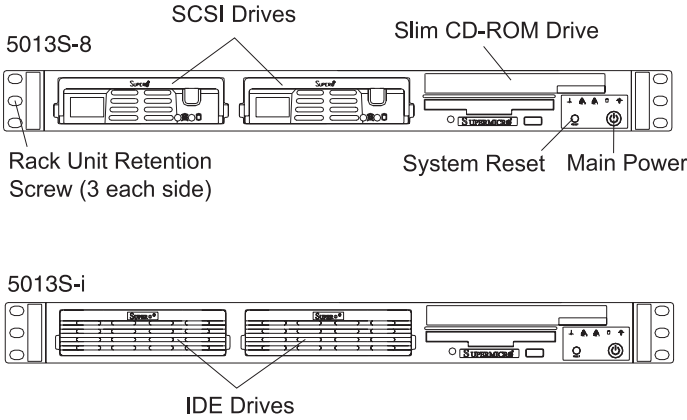
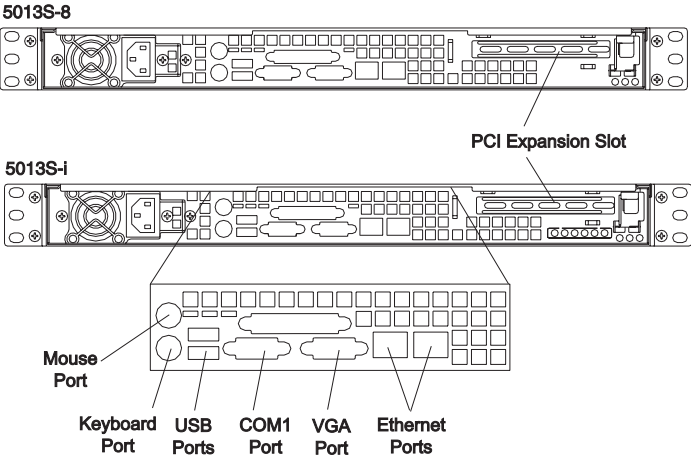


Figure 6-2. Chassis Rear View



6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the motherboard to provide you with system control

buttons and status indicators. These wires have been bundled together in a ribbon cable to simplify the connection. Connect the cable from JF1 on the motherboard to JP4 on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both JF1 and JP4. Pull all excess cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3 System Fans

One 10-cm blower fan provides all the cooling needed for the SuperServer 5013S-8/5013S-i. The chassis includes air seals under the blower fan and at the chassis cross section, which separates the drive bay area from the motherboard area of the chassis to promote better airflow. It is highly important that the air seal is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis. See Figure 6-3 for locations.

System Fan Failure

The blower fan runs at a full 100% rpm. If the fan fails, the ambient air temperature in the chassis will rise and activate the overheat LED on the control panel. You will need to power down the system to replace this fan.

Replacing System Cooling Fans

1. Removing the blower fan

After turning off the power to the system, first remove the chassis cover and unplug the fan cable from the motherboard. Lift the blower fan from the mounting posts and pull it completely out from the motherboard. See Figure 6-3.

2. Installing a new blower fan

Replace the failed fan with an identical 10-cm, 12 volt fan (available from Supermicro). Position the new fan in its proper place in the chassis by fitting the fan onto the fan mounting posts in the chassis. After the new fan has been installed, plug the fan cable back into the same chassis fan header on the motherboard you removed it from. Make sure the air seal under the fan is properly installed and creating a good seal. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off. Finish by replacing the top panel of the chassis.

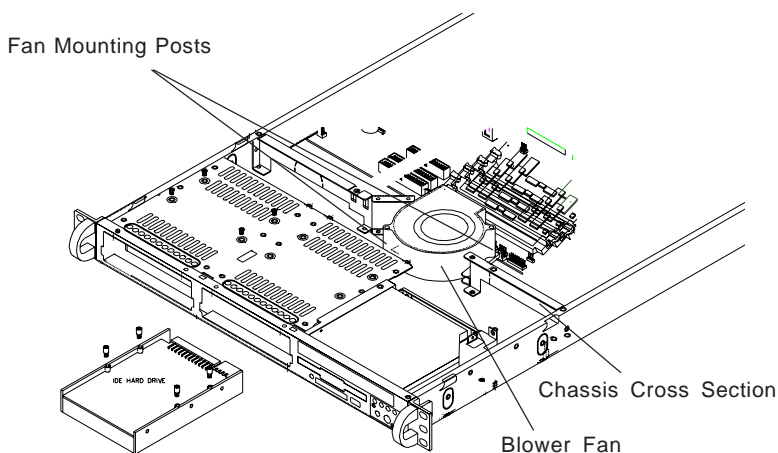


Figure 6-3. System Cooling Fans

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

SCSI Drives: You do not need to access the inside of the chassis to replace or swap SCSI drives. Proceed to the next step for instructions.

Note: You must use standard 1" high, 80-pin SCA SCSI drives in the SuperServer 5013S-8.

CD-ROM/IDE/Floppy Disk Drives: For installing/removing the CD-ROM, IDE or floppy disk drives, you will need to gain access to the inside of the 5013S-8/5013S-i by removing the top cover of the chassis. Proceed to the "CD-ROM and Floppy Drive Installation" section later in this chapter for instructions.

Note: Only a "slim" CD-ROM drive will fit in the 5013S-8/5013S-i.

SCSI Drive Installation (5013S-8)

1. Mounting a SCSI drive in a drive carrier

The SCSI drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the SCSI drive bays. For this reason, even empty carriers without SCSI drives installed must remain in the chassis. To add a new SCSI drive, install a drive into the carrier with the printed circuit board side toward the carrier so that the mounting holes align with those in the carrier. Secure the drive to the carrier with four screws, as shown in Figure 6-4.

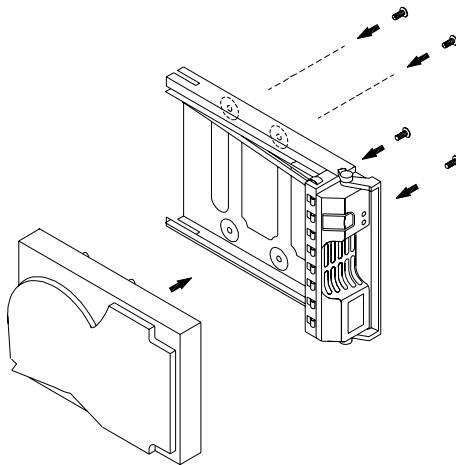


Figure 6-4. Mounting a SCSI Drive in a Carrier



Use caution when working around the SCSI backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.



Important: Regardless of how many SCSI hard drives are installed, both SCSI drive carriers must remain in the drive bays to maintain proper airflow.

2. Installing/removing hot-swap SCSI drives

Two SCSI drive bays are located in the front of the chassis, making them easily accessible for installation and removal. These SCSI drives are hot-swap units, meaning they can be installed and removed without powering down the system. To remove, first push the release button located beside the drive LEDs, then swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-5).

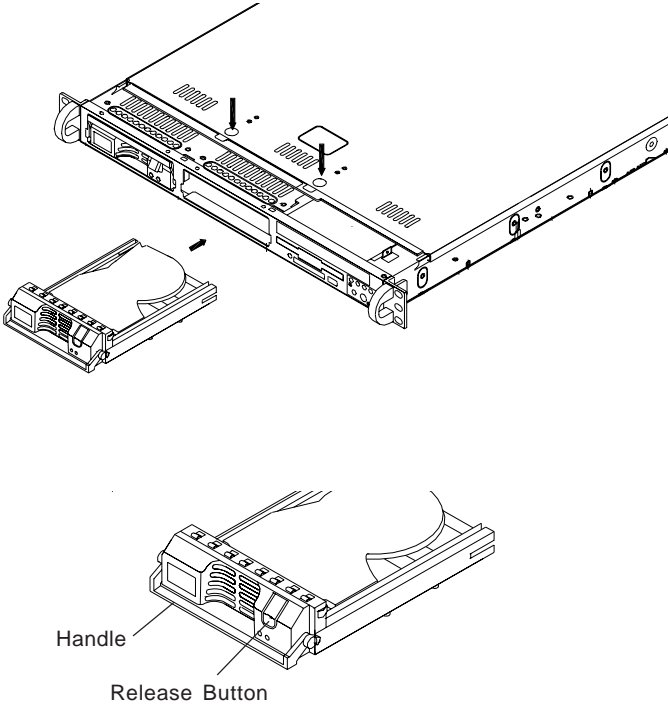


Figure 6-5. Removing SCSI Drives



Important: Regardless of how many SCSI hard drives are installed, both SCSI drive carriers must remain in the drive bays to maintain proper airflow.

SCSI Power Cables

SCSI power cables should be routed so that they do not block the airflow through the chassis. There is a 4-pin connector for the power cables.

SCA Backplane

The SCSI drives plug into an SCA backplane that provides power, SCSI ID and bus termination. A RAID controller can be used with the SCA backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the SCSI drives. The SCA SCSI backplane is already preconfigured, so there are no jumpers or switches present on it.

IDE Drive Installation (5013S-i)

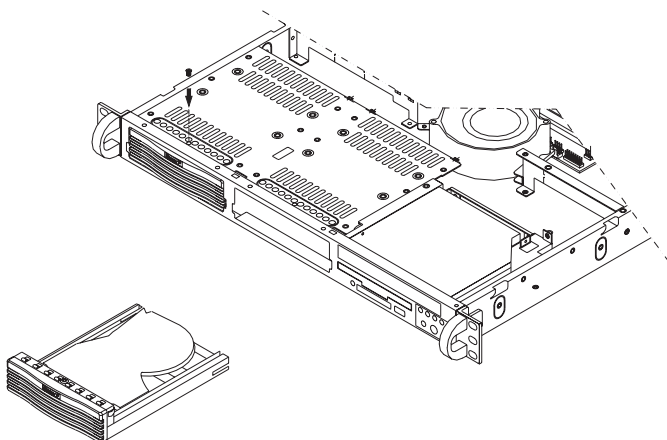
1. Mounting an IDE drive in a drive carrier

Like SCSI drives, IDE drives are also mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow. For this reason, even empty carriers without IDE drives installed must remain in the chassis. To add a new IDE drive, install a drive into the carrier with the printed circuit board side toward the carrier so that the mounting holes align with those in the carrier. Secure the drive to the carrier with the four screws.

2. Installing/removing IDE drives

The two IDE drive bays are located in the front of the chassis, making them easily accessible for installation and removal. The IDE drives are not hot-swap units, meaning system power must be turned off before installing and/or removing them. To install or remove a drive, first power down the system and then remove the top cover of the chassis. Unscrew the retention screw at the top center of the drive, then push the drive carrier out from the back until you can grasp and pull it out through the front of the chassis (see Figure 6-6). Reverse this procedure when installing a drive carrier, making sure you screw in the retention screw. Replace the top cover when finished.

Figure 6-6. Removing IDE Drives (5013S-i)



CD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the CD-ROM and floppy drive bays. The CD-ROM drive must have a "slim" profile to fit into the 5013S-8/5013S-i.

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. You must power down the system before installing or removing floppy, CD-ROM or IDE drives.

Drives mount on rails and should "click" into place to be correctly and fully installed in their bays.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

6-5 Power Supply

The SuperServer 5013S-8/5013S-i has a single 250 watt power supply. This power supply has an auto-switching capability, which enables it to automatically sense and operate at between 100v and 240v. A power on/off switch is located at the back of the power supply. Turning this power switch to the off position will remove both main and standby power from the system.

Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replacement units can be ordered directly from Supermicro (see contact information in Chapter 1).

Replacing the Power Supply

1. Accessing the inside of the SuperServer 5013S-8/5013S-i

To replace a power supply, you must first remove the top chassis cover. To do so, first release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and push it away from you. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Removing the power supply

First unplug the power cord from the system. To remove the failed power unit, remove the two screws on the back of the power supply, which secure it to the chassis. You can then lift the unit straight out of the chassis. (The power cord should have already been removed.)

3. Installing a new power supply

Replace the failed unit with another unit of the same wattage. It is highly recommended to replace it with the exact same power supply. Carefully insert the new unit into position in the chassis and secure it with the two screws at the rear of the unit. Before reconnecting the power cord, make sure the power switch on the power supply is in the off position. Then reconnect the power cord, replace the chassis top cover and push the unit back into the rack. Finish by turning the power switch on the power supply on, and then depress the power button on the front of the system.

Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMIBIOS for the X5SS8-GM/X5SSE-GM. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our web site for any changes to BIOS that are not reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The BIOS ROM stores the system parameters, such as amount of memory, type of disk drives and video displays, etc. BIOS ROM requires very little power. When the computer is turned off, a back-up battery provides power to the BIOS ROM, enabling it to retain the system parameters. Each time the computer is powered-on, the computer is then configured with the values stored in the BIOS ROM by the system BIOS, which gains control when the computer is powered on.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 4-3 gives detailed descriptions of each parameter setting in the Setup utility.

An AMIBIOS identification string is displayed at the left bottom corner of the screen, below the copyright message.

7-2 BIOS Features

- Supports Plug and Play V1.0A and DMI 2.3
- Supports Intel PCI (Peripheral Component Interconnect) (PME) local bus specification 2.2
- Supports Advanced Power Management (APM) specification v 1.1
- Supports ACPI
- Supports Flash ROM

AMIBIOS supports the LS120 drive made by Matsushita-Kotobuki Electronics Industries Ltd. The LS120:

- Can be used as a boot device
- Is accessible as the next available floppy drive

AMIBIOS supports PC Health Monitoring chips. When a failure occurs in a monitored activity, AMIBIOS can sound an alarm and display a message. The PC Health Monitoring chips monitor:

- CPU temperature
- Chassis intrusion detector
- Five positive voltage inputs
- Three fan speed monitor inputs

7-3 Running Setup

**Optimal default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the Standard Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

The Main BIOS Setup Menu

Press the <Delete> key during the POST (Power On Self Test) to enter the Main Menu of the BIOS Setup Utility. All Main Setup options are described in this section. The Main BIOS Setup screen is displayed below.

BIOS SETUP UTILITY		
Main	Advanced	Chipset
PCIPnP	Power	Boot
Security	Exit	
AMIBIOS Version:	07.00xx	
BIOS Build Date:	05/22/02	
BIOS ID:	4DS80603	
Processor Type:	Intel®Xeon®	
Processor Speed:	2400 MHz	
System Memory:	2048 MB	
System Date	[10:10:00]	
System Time	[05/29/02]	
		↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
V07.00 (C)Copyright 1985-2001, American Megatrends, Inc.		

Use the Up/Down arrow keys or the <Tab> key to move between the different settings in the above menu.

When the items "System Time", and "System Date" are highlighted, type in the correct time/date in the time field, and then press "Enter". The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format. The time is in also 24-hour format. For example, 5:30 a.m. appears as 05:30:00 and 5:30 p.m. as 17:30:00.

Press the <ESC> key to exit the Main Menu and use the Left/Right arrow keys to enter the the other categories of BIOS settings. The next section is described in detail to illustrate how to navigate through the menus.

Note: Items displayed in gray are preset and cannot be selected. Items with a blue arrow are commands, not options (i.e. Discard Changes).

7-4 Advanced BIOS Setup

Choose Advanced BIOS Setup from the AMIBIOS Setup Utility main menu with the Left/Right arrow keys. You should see the following display. Select one of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub screen for that item. Advanced BIOS Setup options are displayed by highlighting the option using the arrow keys. All Advanced BIOS Setup options are described in this section.

BIOS SETUP UTILITY	
Main Advanced Chipset PCIPnP Power Boot Security Exit	
Setup Warning Setting items on this screen to incorrect values may cause the system to malfunction! > SuperIO Configuration > IDE Configuration > Floppy Configuration > Boot Settings Configuration > Event Log Configuration > Peripheral Device Configuration > System Health Monitor > Remote Access Configuration	Configure SuperIO Chipset Winbond627F ↔ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
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Use the Up/Down arrow keys to select the "Super I/O Configuration line.

When the "Super IO Configuration" line is highlighted, hit "ENTER" to display its menu.

The following Super IO Configuration screen will appear. Here you can select your options for the your computer's I/O (Input/Output) devices.

Super IO Configuration

BIOS SETUP UTILITY	
Advanced	
Configure Winbond627F Serial Port(s) and Parallel P	
Serial Port1 Address	[3F8]
Serial Port1 IRQ	[4]
Serial Port2 Address	[2F8]
Serial Port2 IRQ	[3]
Serial Port2 Mode	[Normal]
Parallel Port Address	[378]
Parallel Port IRQ	[7]
Parallel Port Mode	[ECP]
ECP Mode DMA Channel	[3]
↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
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The Super IO Configuration includes the following items:

Serial Port 1 Address

This option specifies the base I/O port address of serial port 1. The settings for this item include Disabled, **3F8** and 3E8 and 2E8. Select the desired setting and then press "Enter".

Serial Port 1 IRQ

This option specifies the Interrupt Request address of serial port 1. The settings for this item include Disabled, **4** and 3.

Serial Port 2 Address

This option specifies the base I/O port address of serial port 2. The settings for this item include Disabled, **2F8**, 3E8 and 2E8.

Serial Port 2 IRQ

This option specifies the Interrupt Request address of serial port 2. The settings for this item include Disabled, **4** and **3**.

Serial Port 2 Mode

Use this option to choose the Serial Port 2 Mode. The settings are **Normal**, Sharp-IR, SIR and consumer.

Parallel Port Address

This option specifies the I/O address used by the parallel port. The settings for this item include Disabled, **378**, 278 and 3BC. Select your setting and then press "Enter".

Parallel Port IRQ

This option allows the user to set the Parallel Port IRQ. The settings for this item include 5 and **7**.

Parallel Port Mode

This option specifies the parallel port mode. The settings for this item include Normal, Bi-directional, EPP and **ECP**.

ECP Mode DMA Channel

This option allows the user to set the setting for the ECP Mode of the DMA Channel. The settings for this item include 0, 1 and **3**.

IDE Configuration

Onboard PCI IDE Controller

This option allows the user to enable or disable the integrated IDE Controller. The settings include Disabled, Primary, Second and **Both**. Select "Disabled" to disable the Integrated IDE Controller. Select "Primary" to enable the Primary IDE controller only. Select "Secondary" to enable the Secondary IDE Controller only. Select "Both" to enable both Primary and Secondary IDE Controllers.

Primary IDE Master

When entering "Setup", BIOS automatically detects the presence of IDE devices. This displays the auto detection status of the IDE devices. You can also manually configure the IDE drives by providing the following information:

This option allows the user to configure the IDE devices. When the desired item is highlighted (selected), press "Enter" and the following screen will be displayed:

Type

This option sets the type of device that the AMIBIOS attempts to boot from after AMIBIOS POST is completed. The settings include Not installed, **Auto**, CDROM and ARMD. The "Auto" setting allows BIOS to automatically detect the presence of the IDE controller.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB. The settings are Disabled and **Auto**. Select "Disabled" to disable LBA mode. Select "Auto" to enable LBA mode if your device supports it and is not already formatted with the LBA mode.

Block (Multi-Sector Transfer) Mode

This option sets the block mode multi sector transfers option. The settings include Disabled and **Auto**. Disabled: This option prevents the BIOS from using Multi-Sector Transfer on the specified channel. The data to and from the device will occur one sector at a time. Auto: This option allows the BIOS to auto detect device support for Multi-Sector Transfers on the specified channel. If supported, this option allows the BIOS to auto detect the number of sectors per block for transfer from the hard disk drive to memory. The data transfer to and from the device will occur multiple sectors at a time (if the device supports it).

PIO Mode

IDE PIO (Programmable I/O) mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The settings are: **Auto**, 0, 1, 2, 3 and 4.

DMA Mode

This item allows the users to select the DMA mode. The settings are: **Auto**, SWDMA0, SWDMA1, SWDMA2, MWDMA0, MWDMA1, MWDMA2, UWDMA0, UWDMA1, UWDMA2, UWDMA3 and UWDMA4. Select Auto to auto detect the DMA Mode. Select SWDMA0 through SWDMA2 to set single word DMA0 through DMA2. Select MWDMA0 through MWDMA2 to set Multi-word DMA0 through DMA2. Select UDMA0 through UDMA4 to set Ultra DMA0 through Ultra DMA4.

S.M.A.R.T.

S.M.A.R.T stands for Self-Monitoring Analysis and Reporting Technology, a feature that can help predict impending drive failures. The settings are **Auto**, Disabled and Enabled. Select "Enabled" or "Disabled" to enable or disable the S.M.A.R.T. Select "Auto" to auto detect S.M.A.R.T.

32Bit Data Transfer

The settings are Auto, Disabled and **Enabled**. Select "Enabled" or "Disabled" to enable or disable the 32-bit Data Transfer function. Select "Auto" to auto detect the 32-bit Data Transfer function.

ARMD Emulation Type

This option is used to select the ARMD emulation type used when configuring an LS120, MO (Magneto-Optical), or Iomega Zip drive. The settings are **Auto**, Floppy and HardDisk. (ARMD stands for ATA(PI) Removable Media Disk).

Primary IDE Slave

When the system enters "Setup", BIOS automatically detects the presence of IDE devices. This option displays the auto detection status of IDE devices. The settings for "Primary IDE Slave" are the same as those for the "Primary IDE Master".

Secondary IDE Master

This displays the status of auto detection of IDE devices. The settings for "Secondary IDE Master" are the same as those for the "Primary IDE Master".

Secondary IDE Slave

This displays the status of auto detection of IDE devices. The settings for "Secondary IDE Slave" are the same as those for the "Primary IDE Master".

Hard Disk Write Protect

This item allows the user to prevent the hard disk from being overwritten. The options are Enabled or **Disabled**. Disabled allows the drive to be used normally; read, write and erase functions can all be performed. Enabled prevents the hard disk from being erased. This function is effective only when the device is accessed through BIOS.

ATA(PI) Detect Timeout (Seconds)

Set this option to stop the system search for ATAPI devices within the specified number of seconds. The options are 0, 5, 10, 15, 20, 25, 30 and **35** (seconds). Most ATA disk drives can be detected within 5 seconds.

ATA(PI) 80pin Cable Detection

This option allows you to select the mechanism used to detect the 80-pin ATA(PI) cable. The settings are Host, Device and **Host & Device**.

Floppy Configuration

Floppy A

Use this option to specify which of floppy drive you have installed in the A drive. The settings are Disabled, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", **1.44 MB 3 1/2"** and 2.88 MB 3 1/2".

Floppy B

Use this option to specify which of floppy drive you have installed in the B drive. The settings are **Disabled**, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", 1.44 MB 3 1/2" and 2.88 MB 3 1/2".

Floppy Drive Seek

Use this option to Enable or **Disable** the floppy seek routine on bootup.

Boot Settings Configuration

Quick Boot

This option allows the BIOS to skip certain tests that are normally performed on boot up. You can disable the option to speed up boot time. The settings are Disabled and **Enabled**.

Quiet Boot

If Disabled, this option will cause the normal POST messages to be displayed upon setup. When Enabled, the OEM logo is displayed instead of the POST messages. The settings are **Enabled** and Disabled.

Add-On ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages. The settings for this option are **Force BIOS** and Keep Current. Force BIOS

allows the computer to force a third party BIOS to display during system boot. Keep Current has the system display AMIBIOS information on bootup.

BootUp Num Lock

This option is used to select the status of the Number Lock function on your keyboard on bootup. The settings are **On** and Off.

BootUp CPU Speed

This option is used set the CPU speed to either **High** or Low.

PS/2 Mouse Support

This option specifies whether a PS/2 Mouse will be supported. Settings are **Enabled** and Disabled.

Typematic Rate

Set this option to select the rate at which the computer repeats a key that is held down. Settings are **Fast** and Slow. Fast: This sets the rate the computer repeats a key to over 20 times per second. Under normal operations, this setting should not be changed. Slow: This sets the rate the computer repeats a key to under 8 times per second.

System Keyboard

This option is to let the system know if a keyboard is **Present** or Absent.

Primary Display

This option specifies the type of monitor display you have installed on the system. The settings are Absent, **VGA/EGA**, Color 40 x 25, Color 80 x 25 and monochrome.

Parity Check

Use this option to either Enable or **Disable** the use of memory parity checking.

Boot to OS/2

This option can be used to boot the system to an OS/2 operating system. The settings are **No** and Yes.

Wait for F1 if Error

This settings for this option are **Enabled** and Disabled. Disabled: This prevents the AMIBIOS to wait on an error for user intervention. This setting should be used if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached. If this setting is set, the system will continue to bootup in to the operating system. If 'F1' is enabled, the system will wait until the BIOS setup is entered. Enabled: This option allows the system BIOS to wait for any error. If an error is detected, pressing <F1> will enter Setup and the BIOS setting can be adjusted to fix the problem. This normally happens when upgrading the hardware and not setting the BIOS to recognize it.

Hit "Delete" Message Display

This option tells the system to display or not display the "Hit Delete to Enter Setup" message. The settings are **Enabled** and Disabled.

Cache

This option is for enabling or disabling the internal CPU L1 cache. Settings include Disabled, Write-Thru, **Write-Back** and Reserved. Disabled: This option prevents the system from using the internal CPU L1 cache. This setting should be used to slow the computer system down or to troubleshoot error messages. Write-Thru: This option allows the computer system to use the internal CPU L1 cache as Write-Through cache. Write-Through cache is slower than Write-Back cache. It performs write operations to the internal L1 CPU cache and system memory simultaneously. Write-Back:

This option allows the computer system to use the internal CPU L1 cache as Write-Back cache. Write-Back cache is faster than Write-Through cache. Write-Back cache is a caching method in which modifications to data in the cache aren't copied to the cache source until absolutely necessary. Write-back caching is available on all CPUs supported by this BIOS. With these CPUs, write operations stored in the L1 cache aren't copied to main memory until absolutely necessary. This is the default setting.

System BIOS Cacheable

This option enables you to move the system BIOS to the memory cache to improve performance. Settings are **Enabled** and Disabled.

Event Log Configuration

Event Logging

This option **Enables** or Disables the logging of events. You can use this screen to select options for the Event Log Configuration Settings. You can access sub screens to view the event log and mark all events as read. Use the up and down arrow keys to select an item, and the plus (+) and minus (-) keys to change the option setting. The settings are described on the following pages. The screen is shown below.

ECC Event Logging

This option Enables or **Disables** the logging of ECC events. The events logged by AMIBIOS are post errors such as a bad BIOS, floppy errors, or hard drive errors.

Clear All Event Logs

This option can be used to tell the system to clear the event log on the next boot up. The settings are **No** and Yes.

View Event Log

Highlighting this and pressing <Enter> will allow you to view the unread events from the event log area.

Mark All Events As Read

Highlighting [OK] and pressing <Enter> will mark all events in the log area as having been read. The settings are OK and **Cancel**.

Peripheral Device Configuration

Power Lost Control

This option determines how the system will respond when power is reapplied after a power loss condition. Choose **Last State** to automatically start up the system when power is reapplied after an AC power loss. Always Off means you must push the main power button to restart the system after power is restored.

System Health Monitor

The BIOS continuously monitors the health of your system by measuring certain voltage levels and temperatures.

CPU1 Current Temperature

1st System Temperature

2nd System Temperature

These readings display the real-time temperatures of the CPU and two sensor points for chassis temperature. There are also several voltage level monitors as shown on the System Health Monitor screen.

Remote Access Configuration

Remote Access

This option allows the user to redirect the console (display) through the COM port when enabled. This is useful when two computers are hooked up to a single monitor. The function keys are disabled when this setting is enabled. The settings are "Serial ANSI" and "**Disabled.**"

7-5 Chipset Setup

Choose Chipset Setup from the AMIBIOS Setup Utility main menu. The screen is shown below. All Chipset Setup options are described following the screen.

BIOS SETUP UTILITY		
Main	Advanced	Chipset
Memory Timing Control [Manual] Act to Deact [6 Clks] Act to Read/Write [2 Clks] RAS Precharge Time [2 Clks] RA Cycle Time [6 Clks] SDRAM CAS Latency [CAS Latency 2.5] RAS Time Recycle after Refresh [10 Clks] MPS 1.4 Support [Enabled] Hyper-threading [Enabled] Watch Dog Timer [Disabled] Auto DQS Setting Support [Disabled] DQS Selection [16] Spread Spectrum [Disabled] Memory Enhance Mapping [Enabled]		Options for MCH ↔ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
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Memory Timing Control

Determines how the memory timing is controlled. **Auto** lets BIOS program the memory timing from SPD data. Manual allows the user to select the appropriate memory timing.

Act to Deact

The settings are 5 Clks and **6 Clks**.

Act to Read/Write

The settings are **2 Clks** and 3 Clks.

RAS Precharge Time

This determines the duration of the time interval during which the Row Address Strobe signal to a DRAM is held low during normal Read and Write Cycles. The settings are **2 Clks** and 3 Clks.

RAS Cycle Time

This determines the cycle time of a Row Address Strobe. The settings are **6 Clks**, 7 Clks, 8 Clks and 9 Clks.

SDRAM CAS Latency

This sets the CAS latency for system memory. The default setting is **CAS Latency 2.5**.

RAS Cycle Time after Refresh

This determines the amount of active time needed for a Row Address Strobe after a refresh. The settings are 8 Clks, 9 Clks and **10 Clks**.

MPS 1.4 Support

The settings for this option are **Enabled** and Disabled.

Hyper-threading

Enables hyper-threading if supported by the operating system. Hyper-threading is a method of creating an additional "virtual" processor by using parallelism to process multiple instructions simultaneously. The settings for this option are **Enabled** and Disabled.

Watchdog Timer

This option is used to configure the Watchdog timer. Settings are **Disabled**, 2 minutes, 5 minutes, 10 minutes and 15 minutes.

Auto DQS Setting Support

The settings for this option are **Disabled** and Enabled.

DQS Selection

This setting is preset.

Spread Spectrum

Spread Spectrum is a technique used to stabilize a system that is being affected by electromagnetic interference. The settings for this option are **Disabled** and Enabled.

Memory Enhance Mapping

The settings for this option are **Enabled** and Disabled.

7-6 PCI PnP Setup

Choose PCI/PnP Setup from the AMIBIOS Setup main menu. All PCI/PnP options are described in this section. The PCI/PnP Setup screen is shown below.

BIOS SETUP UTILITY	
Main	Advanced Chipset PCIPnP Power Boot Security Exit
Plug & Play O/S	[No]
Reset Config Data	[No]
Allocate IRQ to VGA	[Yes]
Palette Snooping	[Disabled]
PCI IDE BusMaster	[Disabled]
USB Function	[Enabled]
Legacy USB Support	[Auto]
ARMD Emulation Type	[Hard Disk]
	↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
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Plug & Play OS

This option specifies how Plug and Play devices will be configured. The settings are Yes and **No**. **No** lets BIOS configure all devices in the system. Yes lets the operating system (if supported) configure PnP devices not required for bootup.

Reset Configuration Data

Choosing the Yes setting will cause the PnP configuration data in the BIOS to be cleared on the next boot up. Choosing the **No** setting does not force PnP data to be cleared on the next boot.

Allocate IRQ to PCI VGA

This option lets you allocate an interrupt request (IRQ) to the PCI VGA adapter card (if used). The settings are **Yes** and No.

PCI IDE BusMaster

The settings for this option are **Disabled** and Enabled. Enable to specify that the IDE controller on the PCI bus has bus mastering capabilities.

USB Function

The settings for this option are Disabled and **Enabled**. Disabled prevents the use of the USB ports and Enabled allows the use of the USB ports.

Legacy USB Support

This option allows you to enable support for Legacy USB. The settings are **Auto**, Enabled and Disabled.

ARMD Emulation Type

This settings for this option are **Hard Disk**, Auto and Floppy.

7-7 Power Setup

Choose Power from the AMIBIOS Setup main menu. All Power options are described in this section. The Power Setup screen is shown below.

BIOS SETUP UTILITY							
Main	Advanced	Chipset	PCIPnP	Power	Boot	Security	Exit
ACPI Aware O/S				[Yes]			
Power Management				[Enabled]			
Power Button Mode				[On/Off]			
Suspend Timeout (Minutes)				[Off]			
				↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit			
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ACPI Aware O/S

Yes allows the system to utilize Intel's ACPI specification. Windows 3.x®, and Windows NT® are non-ACPI aware operating systems. Windows 95®, Windows 98®, Windows ME® and Windows 2000® are ACPI-aware OS's.

Power Management

When enabled, this option displays the following four options relating to power management. The settings are **Disabled** and Enabled.

Power Button Mode

This determines the function of the chassis power button, either **On/Off** or Suspend. When set to Suspend, depressing the power button when the system is running will cause it to enter a suspend state.

Suspend Timeout

This option specifies the length of hard disk inactivity time that should expire before entering the power conserving state. The settings are **Off**, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 (minutes).

7-8 Boot Setup

Choose Boot Setup from the AMIBIOS Setup main menu. All Boot Setup options are described in this section. The Boot Setup screen is shown below.

BIOS SETUP UTILITY							
Main	Advanced	Chipset	PCIPnP	Power	Boot	Security	Exit
> Boot Device Priority > Hard Disk Drives > Removable Devices > ATAPI CDROM Drives					↔ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit		
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Boot Device Priority

1st Boot Device

This option is used to specify the order of the boot sequence that will be followed from the available system devices. The settings for the 1st Boot Device are **Removable Device**, ATAPI CDROM, Hard Drive and Intel UNDI PXE-2.0 (build 082).

2nd Boot Device

The settings for the 2nd Boot Device are Removable Device, **ATAPI CDROM**, Hard Drive and Intel UNDI PXE-2.0 (build 082).

3rd Boot Device

The settings for the 3rd Boot Device are Removable Device, ATAPI CDROM, **Hard Drive** and Intel UNDI PXE-2.0 (build 082).

4th Boot Device

The settings for the 4th Boot Device are Removable Device, ATAPI CDROM, Hard Drive and **Intel UNDI PXE-2.0 (build 082)**.

Hard Disk Drives

Use this screen to view the boot sequency of hard drives that have been auto-detected or entered manually on your system.

Removable Devices

Use this screen to view the boot sequency of the removeable devices that have been auto-detected or entered manually on your system.

ATAPI CDROM Drives

Use this screen to view the boot sequency ofthe ATAPI CDROM drives that have been auto-detected or entered manually on your system.

Change Supervisor Password

This option allows you to change a supervisor password that was entered previously.

Change User Password

This option allows you to change a user password that was entered previously.

Clear User Password

Use this option to clear the user password so that it is not required to be entered when the system boots up.

Boot Sector Virus Protection

This option allows you to enable or disable a virus detection program to protect the boot sector of your hard disk drive. The settings for this option **Disabled** and Enabled. If Enabled, AMIBIOS will display a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive.

7-10 Exit Setup

Choose Exit Setup from the AMIBIOS Setup main menu. All Exit Setup options are described in this section. The Exit Setup screen is shown below.

BIOS SETUP UTILITY	
Main Advanced Chipset PCIPnP Power Boot Security Exit	
<div> > Exit Saving Changes > Exit Discarding Changes > Load Optimal Defaults > Load Fail-Safe Defaults > Discard Changes </div>	<div>Exit system setup with saving the changes.</div> <div> ↔ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit </div>
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Exit Saving Changes

Highlighting this setting and then pressing <Enter> will save any changes you made in the BIOS Setup program and then exit. Your system should then continue with the boot up procedure.

Exit Discarding Changes

Highlighting this setting and then pressing <Enter> will ignore any changes you made in the BIOS Setup program and then exit. Your system should then continue with the boot up procedure.

Load Optimal Defaults

Highlighting this setting and then pressing <Enter> provides the optimum performance settings for all devices and system features.

Load Failsafe Defaults

Highlighting this setting and then pressing <Enter> provides the safest set of parameters for the system. Use them if the system is behaving erratically.

Discard Changes

Highlighting this setting and then pressing <Enter> will ignore any changes you made in the BIOS Setup program but will not exit the BIOS Setup program.

Notes

Appendix A

AwardBIOS POST Messages

During the Power-On Self-Test (POST), BIOS will check for errors. If an error is found and a correction is needed, BIOS will activate an alarm or display a message.

If a message is displayed, it will be accompanied by the following:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep Codes

Currently, there are two kinds of beep codes used in AwardBIOS. One code indicates that a video error has occurred and that the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that a Rambus error has occurred. This beep code consists of a single long beep that sounds repeatedly.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

CMOS CHECKSUM ERROR

The CMOS checksum is incorrect. This can indicate that CMOS has been corrupted. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain the proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also make sure the disk has been formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

The type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates that the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

The hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize the controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during boot up.

If you are intentionally configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or to reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

FLOPPY DISK(S) fail (80) → Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40) → Floppy Type mismatch.

Hard Disk(s) fail (80) → HDD reset failed

Hard Disk(s) fail (40) → HDD controller diagnostics failed.

Hard Disk(s) fail (20) → HDD initialization error.

Hard Disk(s) fail (10) → Unable to recalibrate fixed disk.

Hard Disk(s) fail (08) → Sector Verify failed.

Keyboard is locked out - Unlock the key.

BIOS detect the keyboard is locked. P17 of the keyboard controller is pulled low.

Keyboard error or no keyboard present.

Cannot initialize the keyboard. Make sure that the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop.

System will repeat POST procedure infinitely while the P15 of keyboard controller is pulled low. This is also used for M/B burn in testing.

BIOS ROM checksum error - System halted.

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail..

BIOS reports the a memory test fail if the onboard memory has an error.

Appendix B

AwardBIOS POST Codes

This section lists the POST (Power On Self Testing) Codes for the Award BIOS.

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	<ul style="list-style-type: none"> ● Disable PS/2 mouse interface (optional). ● Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). ● Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.

Debuggig LED Encoding

Post Code	Encoded LED	Task
C1h	001b	Memory Detection
05h	010b	BIOS Shadowing
07h	011b	KBC Initialization
0Eh	100b	Shadow RAM test
14h	101b	Chipset defaults loaded
26h	110b	Clock generator configured
2Bh	111b	Videoinitilization
52h	000b	Just clear LEDs

POST (hex)	Description
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0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	<ol style="list-style-type: none"> 1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: <ul style="list-style-type: none"> -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	<ul style="list-style-type: none"> ● Program CPU internal MTRR (P6 & PII) for 0-640K memory address. ● Initialize the APIC for Pentium class CPU. ● Program early chipset according to CMOS setup. Example: onboard IDE controller. ● Measure CPU speed. ● Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved

POST (hex)	Description
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.

POST (hex)	Description
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.....
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: •Clear EPA or customization logo.

POST (hex)	Description
80h	Reserved
81h	Reserved
82h	<ol style="list-style-type: none"> 1. Call chipset power management hook. 2. Recover the text font used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	<ol style="list-style-type: none"> 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	<ol style="list-style-type: none"> 1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	<ol style="list-style-type: none"> 1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	<ol style="list-style-type: none"> 1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

Notes

Appendix C

System Specifications

Processors

Single Intel Xeon™ 604/603-pin PGA processors to 3.06 GHz at a 533/400 MHz front side (system) bus speed

Memory Capacity

Four DIMM slots to support a maximum of 4 GB registered ECC DDR-266/200 low-profile SDRAM

DIMM Sizes

128 MB / 256 MB / 512 MB 1 GB 184-pin SDRAM modules supported

SCSI Controller (5013S-8 only)

Adaptec AIC-7902 for dual channel Ultra320 SCSI

SCSI Backplane Controller (5013S-8 only)

SCA backplane for two (2) SCA hot-swap SCSI drives

Main Drive Bays

5013S-8: Two (2) drive bays to house two (2) standard 1" 80-pin SCA SCSI drives

5013S-i: Two (2) drive bays to house two (2) 3.5 x 1" IDE disk drives

Peripheral Bays

One (1) 3.5" floppy drive

One (1) slim CD-ROM drive

PCI Expansion Slots

One (1) 64-bit 66 MHz (5V) PCI slot (bundled with a 64-bit, 66 MHz 5V riser card)

Power Supply

Type: 1 x 250W with +3.3V, +5V, +12V, -5V and -12V main DC outputs and a 5V standby output.

Input Voltage: 100-240VAC (w/ \pm 10% tolerance - units are auto-switching capable)

Fans: Two 4-cm ball bearing fans

Safety Regulations: UL 1950, CUL, TUV

EMI: FCC part 15, CISPR 22 (EN 55022)

Operating Environment

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 70° C (-40° to 158° F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5 to 95% (non-condensing)

Cooling Fans

System: One (1) 10-cm ball bearing blower fan

Form Factor

X5SS8-GM/X5SSE-GM Motherboard: ATX

SC810 chassis: 1U rackmount

Dimensions

16.7 x 1.7 x 22.7 in.; 425 x 44 x 560 mm (W x H x D)

Weight

Net: Full System: ~26 lbs. (11.8 kg.)

Gross: Full System: ~32 lbs. (14.5 kg.)

Regulatory Compliance

Electromagnetic Emissions:

FCC Class B, EN 55022 Class B, EN 61000-3-2/-3-3, CISPR 22 Class B

Electromagnetic Immunity:

EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4,

EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:

EN 60950/IEC 60950-Compliant

UL Listed (USA)

CUL Listed (Canada)

TUV Certified (Germany)

CE Marking (Europe)